U.S. FISH AND WILDLIFE SERVICE RESPONSE DURING THE CHALK POINT OIL SPILL

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Introduction

As a federal trustee for the nation's wildlife resources, the U.S. Department of the Interior's (DOI) Fish and Wildlife Service (FWS) has a responsibility to conserve, enhance, and protect fish and wildlife, their habitats, and refuge lands. This responsibility includes prevention of, and response to spills, both chemical and oil. Spill response is a significant role for FWS personnel to address when FWS trust resources are involved. Duties carried out by FWS personnel during a spill event include: documenting impacts to wildlife and their habitats, keeping wildlife out of impacted areas, collecting dead and injured wildlife, identifying sensitive environments, providing oversight of wildlife rehabilitation groups, and gathering information for potential Natural Resources Damage Assessment. This report focuses on the wildlife response activities conducted by FWS personnel during the Chalk Point oil spill which took place April 7, 2000 near the town of Aquasco, Maryland. The spill, which resulted from a ruptured underground pipeline that transported oil to the Potomac Electric Power Company (PEPCO) Chalk Point Facility, released approximately 126,000 gallons of a mixture of #2 and #6 fuel oil into Swanson Creek, a tidal tributary of the Patuxent River. The main stem of the Patuxent River, associated shoreline habitats, and other tributaries were also impacted by oil after heavy winds on the evening of April 9 blew oil over containment booms placed at the confluence of Swanson Creek and Patuxent River. During the spill, as many as 18 technical staff from the FWS and DOI were involved in response, with over 2,700 man hours documented. Fortunately, the spill occurred at a time when most migratory fish and birds (waterfowl) had already passed through the Patuxent River area. Most anadromous fish returning from higher saline waters of the Bay to spawn in the upper reaches of the Patuxent had spawned weeks earlier. A majority of the waterfowl had already left the Patuxent River system for the Canadian breeding grounds some time in late March. Had the spill occurred a month or two earlier, wildlife impacts would probably have been much greater. During the spill, extensive wetland habitats were impacted as were a number of other FWS trust resources including migratory birds (mostly waterfowl). FWS response activities were broken down into 5 major categories: wildlife survey teams, wildlife rehabilitation, wildlife morgue operations, protection of threatened and endangered species, and identification of environmentally sensitive areas. The following is a summary of each activity.

Wildlife Survey Teams

One of the first tasks of the FWS Field Response Coordinator (FRC) was to develop wildlife survey teams. The purpose of the teams was to document wildlife impacts and use within the spill zone. The wildlife survey teams were made up of 2-4 individuals that were composed of personnel from FWS, Maryland Department of Environment (MDE), Maryland Department of Natural Resources (MDNR), and, later, by trained volunteers. The initial number of teams was four and later expanded to 12 teams. Each team was radio equipped and assigned a specific shoreline zone within Swanson Creek or the Patuxent River. Within each zone each survey team recorded on spill data sheets the following information: wildlife observed within the zone (number and species); degree of oiling (none, lightly, moderately, or heavy) on observed wildlife; extent of oiling along shoreline (none, light, moderately, and heavy). In addition, each team collected any dead wildlife they encountered. Dead specimens were placed into plastic bags and labeled with date and location. In the event that oiled wildlife (still alive) were observed, teams were instructed to not attempt capture, but to radio the Wildlife Trailer located at the Command Center (PEPCO Chalk Point facility) with the following information: species, number, degree of oiling; landowner's name , address, and phone number if available; and any visible landmarks. Upon receiving the information, the FWS dispatched a wildlife rehabilitation response team to attempt to capture the impacted wildlife. To facilitate a more rapid wildlife recovery effort, and reduce response time, a number of response boats were also used in the recovery effort. Captured animals were transported to the wildlife triage area (building No. 7 at PEPCO Chalk Point Facility) and treated appropriately before being transported to an off-site rehabilitation center (Chesapeake Wildlife sanctuary, Bowie, MD [CWS], or Tri-State Bird Rescue and Research [TSBRR], Newark, DE). After each team had completed a zone survey, team leaders radioed in their survey data to the Wildlife Trailer where it was recorded on maps. The wildlife survey data was then passed on by the FRC to the Planning Section Chief. Time permitting, upon completion of their initial survey, wildlife survey teams were assigned another zone for surveying. Wildlife survey teams performed these tasks daily for the first nine days of the spill. Additional information on bird populations in the area was provided via an aerial survey conducted by the MDNR on April 12, 2000. The survey encompassed the Patuxent River from Eagle Harbor to the mouth of the river (Table 1).

Wildlife surveys ended the week of April 17, 2000 when it was determined that there was minimal additional recovery of dead and injured wildlife. Results of the wildlife survey teams showed that the most commonly observed animal group were birds (Figure 1). Greater than 300 were observed the first day of the surveys, 50% of which were observed to be oiled to some degree (Figure 2). During the wildife surveys it was observed that when mammals (mostly muskrats) were encountered they were generally always oiled to some degree, usually 100% of the time (Figure 2). The last day wildlife surveys were conducted, the number of birds observed declined dramatically from the first day (i.e., 80% decline); however, those birds observed still showed signs of oiling, with greater than 30% deemed to be oiled (Figure 2).

Wildlife Rehabilitation Operations

The wildlife rehabilitation responsibilities of the FWS were limited to oversight of the rehabilitation efforts and consolidating the data from each of the two wildlife rehabilitators. The rehabilitation data included: species, number collected, number rehabilitated, number died in rehabilitation, and number released. The preceding information was provided to the FWS on a daily basis. Each morning a daily report of rehabilitation activities was compiled by the FWS and forwarded to the various units within the Command Center e.g., Joint Information Center and Planning, and to MDNR. As mentioned previously, rehabilitation and recovery of the oiled wildlife was conducted by TSBRR and CWS. In an effort to minimize conflict between the two rehabilitators, it was determined by the FWS that all incoming wildlife would be assessed by TSBRR veterinarians as either critical or non-critical. All critical care wildlife were handled by CWS because of the close proximity of their rehabilitation center located in Bowie, Maryland. Non-critical wildlife were transported out of state to the TSBRR facility in Newark, Delaware.

Upon arrival at the triage building, TSBRR and CWS conducted the appropriate rehabilitation procedures, which included taking swabs of fur/feathers and feet for potential criminal evidence. The swabs were wrapped in an aluminum foil, placed in plastic storage bags, and then frozen. The swabs were stored in a locked freezer located in the triage building. On a daily basis, the FWS would take possession of the swabs and complete a chain of custody. Upon completion of chain of custody, the swabs were stored in a locked freezer located in the triage building. Chain of custody was completed when the swabs were given to FWS Special Agents. The Service was also responsible for recording the numbers of wildlife which were rehabilitated. Animals which died during rehabilitation were also recorded into the animal logs, and processed accordingly (See Morgue section)

During the spill, personnel associated with the spill cleanup and private citizens were able to contact the Command Center and report the location of oiled wildlife through a wildlife hotline that was established. Most incoming calls came directly to the Wildlife Trailer, if not, they were passed on to the trailer by the Operations Section. When a hotline call was received, personnel from the FWS, TSBRR and/or CWS were dispatched to retrieve the oiled wildlife and returned it to the wildlife triage building. The FWS, with assistance from MDNR, manned the Wildlife Hotline until incoming calls were minimal. The maximum number of Wildlife Hotline calls (16) were received on day 5 after the pipeline release. After day 8 of the pipeline release, incoming Wildlife Hotline calls started to decline gradually. By day 13, incoming calls were two or less, by days 14-18, calls were less than two a day. (Figure 3). On April 26 (day 18 after the pipeline release),TSBRR and CWS received calls directly and recovered injured wildlife.

Wildlife rehabilitation operations involved the live capture of 204 individuals, most of which were waterfowl (53%) and reptiles (33%), the remaining 14% were comprised of mammals, fish and invertebrates (Table 2). Eighty five percent of the captured wildlife were successfully released back into the wild. Of those animals that died in rehabilitation, ruddy ducks and muskrat appeared to be the two most vulnerable species (Table 2).

Morgue Operations

As mentioned earlier, wildlife survey teams collected any dead wildlife they encountered. Later in the response effort, oil spill cleanup crews, and shoreline cleanup assessment teams (SCAT) also collected dead wildlife. All retrieved wildlife carcasses, and wildlife that died during the rehabilitation were processed by FWS personnel. After being labeled appropriately by the field or rehabilitation teams, each carcass was placed in a plastic bag, and taken to the PEPCO wastewater laboratory for processing (i.e., "the morgue"). Prior to being processed, the carcasses were temporarily stored at the laboratory or triage building in a freezer/refrigerator. The appropriate information for each wildlife carcass was entered into an animal logbook located in the laboratory. The logbook entries included an identification number, species, location of collection, time of retrieval, and general observations. An identical logbook was kept at the Wildlife Trailer. When the wildlife carcasses were being prepared for storage as evidence, each animal was wrapped in aluminum foil, labeled as follows: species, identification number, and date. Upon wrapping and labeling, each animal was placed in a sealed plastic bag; transported to the wildlife triage building, and stored in a locked freezer. Chain of custody forms for the animal carcasses were completed daily and stored at the Wildlife Trailer. Another chain of custody was completed when each carcass was given to FWS Special Agents. One ruddy duck and and two muskrats were sent by the FWS to the National Fish and Wildlife Forensics Laboratory (NFWFL) in Ashland, Oregon for necropsy to determine cause of death. Copies of the necropsy reports are not available for release at this time. A daily morgue report was generated and accompanied the daily wildlife rehabilitation report that was distributed each morning (Appendix A and see Wildlife Rehabilitation Operations section).

April 26, 2000 was the final date that the FWS had personnel operating the wildlife morgue. Following this date, TSBRR assumed these responsibilities. Wildlife morgue procedures remained the same under TSBBR with the exception that all dead wildlife were brought to the wildlife triage center instead of the wastewater laboratory. On May 8, 2000 fish and invertebrate carcasses were photographed and the animals discarded. The decision to dispose of the fish and invertebrate carcasses was made by the U.S Attorney's Office at the recommendation of the FWS. The purpose of the FWS recommendation to dispose of fish and invertebrate was related to available freezer space. Fish and invertebrates were by far the most abundant taxa brought into the morgue, and rapidly took up valuable freezer space. In addition, many deaths appeared unrelated to oil exposure. For example, many of the larger fish collected were gizzard shad and catfish (Table 3). These two species are commonly found dead along shorelines during the spring and summer months.

The number of wildlife found dead in the field and brought to the morgue center was 804 individuals, 67% of which were fish (Table 3). It should be noted that hundreds of dead mummichogs were observed in tidal tributaries of Swanson Creek; however, only a subsample of these fish were collected (Table 3). Birds and mammals accounted for 17 % of the dead individuals. Ruddy ducks and muskrat were species that accounted for most deaths. Less than 3% of the collected dead wildlife were reptiles, most of which were diamondback terrapins and Northern watersnakes. As with fish, it should be noted that not all specimens collected were killed as a result of the spill. For example, the 3 otters that were collected

appeared to have been dead before the spill took place, based on condition of the carcass at time of collection. Similarly, the three ospreys that were collected were not visibly oiled. Where possible, we have noted the number of collected animals that were not visibly oiled (Table 3, Appendix B).

Endangered Species Issues

The section of Swanson Creek and Patuxent River impacted by the spill is also utilized by several pairs of nesting bald eagles, a federally listed endangered species. Six nests were identified within the spill zone, three of which were active during the spill. Two of the active nests were located near the mouth of Swanson Creek, one on the north shore slightly west of the PEPCO cooling towers, the other nest was located along the southern shoreline directly across from the cooling towers. The third active nest was located along Cremona Creek, which is located approximately 6 miles south of Swanson Creek. Both Swanson Creek nests failed to fledge young, however, fledging failure was not attributed to the oil spill. The Cremona Creek nest, however, did successfully fledge two eaglets. Monitoring of the 3 nests by FWS showed that the nest located along the southern shoreline of Swanson Creek did not have eggs or young despite the incubation posture exhibited by the adults. The second Swanson Creek nest did produce young, however, a wind storm blew the nest tree down during the spill, resulting in the death of the nestlings. During the monitoring period, nesting material was collected from each of the three active nests. The material did not appear oiled based on visual and olfactory inspection. Because overflights by helicopters, at least two a day, were conducted along the river to document oiling, in close proximity to eagle nests, the FWS requested that the Federal On Scene Coordinator (FOSC) contact the Federal Aviation Administration and issue a no fly zone along the western shoreline of the Patuxent River, and in an area near the mouth of Swanson Creek. The no fly zone included a minimal radius of 0.25 mile around each nest, and vertical distance of no less than 1,500 feet above each nest. The FWS also recommended that all low flying aircraft remain close to the eastern shoreline of the Patuxent River, where no active eagle nests are known to exist. A second federally listed endangered species, the puritan tiger beetle, is also present near the Patuxent River. However, FWS concerns for impacts to this species were minimal due to their presence near the mouth of the Patuxent River, a distance of approximately 20 miles from Swanson Creek.

Identification of Environmentally Sensitive Areas

At the onset of the spill it was apparent that significant oiling of extensive tidal marshes had occurred in Swanson Creek. In an effort to reduce further impacts to un-oiled marshes and other sensitive environments, the FWS along with personnel from MDNR's Heritage program provided the FOSC with prioritized environmentally sensitive areas. Most of the identified sensitive areas were wetland habitats that fringed many of the tributaries entering the Patuxent River near the vicinity of Swanson Creek. These sensitive habitats were already identified in the Upper Chesapeake Estuary Area Contingency Plan and made prioritization a reasonably easy task. With the information provided to the FOSC, booming strategies were developed. Unfortunately, early in the spill several tidal marshes were identified as priority areas that needed booming (Indian and Trent Hall Creeks) were severely impacted by oil because of

failure by contractors to boom these areas. Wetlands within Indian and Trent Hall Creek, excluding those in Swanson Creek, were two of the most impacted areas during the spill.

Table 1. Results of aerial bird survey conducted by the Maryland Department of Natural Resources on April 12, 2000. Survey area was from Eagle Harbor to the mouth of the Patuxent River.

Taxa	**Number observed**
Mallard	14
Ruddy Duck	774
Great Blue Heron	1
Cormorant	13
Osprey	5
Canada Geese	9
Gull	207
Terns	12
Scaup	34
Mute Swan	27
Bufflehead	40
Canvasback	2
Black Duck	4
Common Loon	5
Red breasted Merganser	1

Table 2. Cont'd. List of wildlife captured and the results of rehabilitation efforts during the Chalk Point oil spill during the period April 7 to June 20, 2000.

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TAXA	No. Captured for Rehabilitation	No. Died	No. Released
BIRDS			
Canada Goose	8	0	8
Double-crested Cormorant	1	1	0
Coot	3	1	2
Domestic & Hybrid Ducks	9	0	9
Grackle	1	0	1
House Finch	1	1	0
Mallard Duck	37	1	36
Mute Swan	7	0	7
Osprey	4	0	4
Peking Duck	9	0	9
Ring-Billed Gull	1	1	0
Ruddy Duck	24	4	20
Savanna Sparrow	1	1	0
Barn Swallow	1	0	1
Virginia Rail	1	1	0
Warbler	1	1	0
BIRD TOTALS	**109**	**12**	**97**
BIRD EGGS			
Osprey	6	0	6
BIRD EGG TOTALS	**6**	**0**	**6**
MAMMALS			
Muskrat	8	7	1
MAMMAL TOTALS	**8**	**7**	**1**
REPTILES			
Black Rat Snake	1	0	1
Box Turtle	2	0	2
Diamondback Terrapin	8	0	8
Garter Snake	1	0	1
Eastern Mud Turtle	20	1	18
Painted Turtle	3	0	3
Rat Snake	3	0	3

Table 2. Cont'd. List of wildlife captured and the results of rehabilitation efforts during the Chalk Point oil spill during the period April 7 to June 20, 2000.

Snapping Turtle	11	0	11
Unidentified Snake	1	0	0
Northern Water Snake	17	4	13
REPTILE TOTALS	**67**	**5**	**60**
TAXA	**No. Captured for Rehabilitation**	**No. Died**	**No. Released**
FISHES			
Carp	1	1	0
Catfish	1	1	0
FISH TOTALS	**2**	**2**	**0**
INVERTEBRATES			
Blue Crab	10	1	9
Horseshoe Crab	2	0	2
INVERTEBRATE TOTALS	**12**	**1**	**11**
TAXA TOTALS	**204**	**27**	**175**

Table 2. Cont'd. List of wildlife captured and the results of rehabilitation efforts during the Chalk Point oil spill during the period April 7 to June 20, 2000.

Table 3. Summary of dead wildlife, including dead animals collected by field teams and mortality incurred during rehabilitation, during the Chalk Point oil spill from April 7 to June 20, 2000. Where possible, we have indicated when animals were not visibly oiled or deaths did not appear to be oil related.

TAXA	COLLECTED DEAD	REHAB. DEATHS	TOTAL DEAD	COMMENTS
BIRDS				
Double-crested Cormorant	3	1	4	Dead w/ no visible oil: 1
Coot	1	1	2	
Great Blue Heron	2	0	2	
Herring Gull	1	0	1	
House Finch	0	1	1	Dead w/no visible oil: 1
Kingfisher	1	0	1	
Loon	1	0	1	
Mallard Duck	1	1	2	
Osprey	3	0	3	Death not spill related: 1 Death may not be spill related: 1
Ring-Billed Gull	2	1	3	Death not oiled related: 1
Ruddy Duck	35	4	39	
Savanna Sparrow	0	1	1	
Unidentified Tern	2	0	2	
Unidentified Bird	1	0	1	
Virginia Rail	0	1	1	
Unidentified Warbler	2	1	3	Dead w/no visible oil: 2
BIRD TOTALS	**55**	**12**	**67**	
BIRD EGGS				
Mallard Duck	24	0	24	
Mute Swan	2	0	2	
BIRD EGG TOTALS	**26**	**0**	**26**	
MAMMALS				
Cat	1	0	1	
Groundhog	2	0	2	Dead w/no visible oil: 2
Mouse	1	0	1	Dead w/no visible oil: 1
Muskrat	63	7	70	Dead w/no visible oil: 4
Opossum	8	0	8	Dead w/no visible oil: 4
Raccoon	3	0	3	Dead w/no visible oil: 2

Table 2. Cont'd. List of wildlife captured and the results of rehabilitation efforts during the Chalk Point oil spill during the period April 7 to June 20, 2000.

Red Fox	1	0	1	
River Otter	3	0	3	Death not spill related: 2 Death may not be spill related: 1
Vole	1	0	1	
MAMMAL TOTALS	**83**	**7**	**90**	
TAXA	**COLLECTED DEAD**	**REHABILITATION DEATHS**	**TOTAL DEAD**	
REPTILES				
Cooter Turtle	2	0	2	Dead w/no visible oil: 1
Diamondback Terrapin	7	0	7	Dead w/no visible oil: 3 Death may not be oil related: 2
Eastern Mud Turtle	0	1	1	
Snapping Turtle	1	0	1	
Painted Turtle	1	0	1	Dead w/no visible oil: 2
Unidentified Snake	3	0	3	Dead w/no visible oil: 1
Northern Water Snake	6	4	10	Death not oil related: 1
REPTILE TOTALS	**20**	**5**	**25**	
FISHES				
American Shad	1	0	1	
Bullhead	1	0	1	
Carp	5	1	6	Dead w/no visible oil: 5
Catfish	32	1	33	Dead w/no visible oil: 18
Eel	7	0	7	Dead w/no visible oil: 6
Gizzard Shad	169	0	169	Dead w/no visible oil: 98
Hog Choker	1	0	1	
Mummichog	99	0	99	100s observed
Striped Bass	2	0	2	Dead w/no visible oil: 1
Perch	8	0	8	Dead w/no visible oil: 1
Unidentified Fish	212	0	212	Dead w/no visible oil: 189
FISH TOTALS	**537**	**2**	**539**	
INVERTEBRATE				
Blue Crab	49	1	50	Dead w/no visible oil: 9
Horseshoe Crab	1	0	1	
Jellyfish	13	0	13	> 1000 observed
Mussel	20	0	20	
INVERTEBRATE TOTALS	**83**	**1**	**84**	

Table 2. Cont'd. List of wildlife captured and the results of rehabilitation efforts during the Chalk Point oil spill during the period April 7 to June 20, 2000.

TOTALS	**804**	**27**	**831**	

Appendix A

Daily Wildlife Reports prepared by U.S. Fish and Wildlife Service during the Chalk Point Oil Spill

ANIMAL LOG

Prepared By: U.S. Fish and Wildlife Service
Report Date / Time: 06/28/00 at 1200 Hours

Coverage Date: 04/07/00 to 06/20/00

CUMULATIVE COUNT

	Rehabilitation				Collected	TOTAL	
Animal	**Captured**	**Rehab**	**Died**	**Released**	**Dead**	**DEAD**	**Comments**
BIRDS							
Canada Goose	8	0	0	8	0	0	Rehab death not oil related: 1
double-breasted Cormorant	1	0	1	0	3	4	Dead w/ no visible oil: 1
Coot	3	0	1	2	1	2	
Domestic & Hybrid Ducks	9	0	0	9	0	0	Rehab not oiled: 1.
Grackle	1	0	0	1	0	0	Rehab not oiled: 1
Great Blue Heron	0	0	0	0	2	2	
Herring Gull	0	0	0	0	1	1	
House Finch	1	0	1	0	0	1	Rehab death w/ no visible oil
Kingfisher	0	0	0	0	1	1	
Loon	0	0	0	0	1	1	
Mallard Duck	37	0	1	36	1	2	
Mute Swan	7	0	0	7	0	0	
Osprey	4	0	0	4	3	3	Dead may not be oil related: 2
Peking Duck	9	0	0	9	0	0	
Ring-Billed Gull	1	0	1	0	2	3	Death not oil related: 1
Ruddy Duck	24	0	4	20	35	39	
Savanna Sparrow	1	0	1	0	0	1	
Barn Swallow	1	0	0	1	0	0	
Tern	0	0	0	0	2	2	
Unidentified Bird	0	0	0	0	1	1	
Virginia Rail	1	0	1	0	0	1	
Warbler	1	0	1	0	2	3	Dead w/ no visible oil: 2
BIRD TOTALS	**109**	**0**	**12**	**97**	**55**	**67**	
BIRD EGGS							
Mallard Duck	0	0	0	0	24	24	
Mute Swan	0	0	0	0	2	2	
Osprey	6	0	0	6	0	0	
EGG TOTALS	**6**	**0**	**0**	**6**	**26**	**26**	
MAMMALS							
Cat	0	0	0	0	1	1	
Groundhog	0	0	0	0	2	2	Dead w/ no visible oil: 2
Mouse	0	0	0	0	1	1	Dead w/ no visible oil: 1
Muskrat	8	0	7	1	63	70	Rehab death w/ no visible oil: 1. Dead w/ no visible oil: 3
Opossum	0	0	0	0	8	8	Dead w/ no visible oil: 4
Raccoon	0	0	0	0	3	3	Dead w/ no visible oil: 2
Red Fox	0	0	0	0	1	1	
River Otter	0	0	0	0	3	3	Cause of death unknown: 3
Vole	0	0	0	0	1	1	
MAMMAL TOTALS	**8**	**0**	**7**	**1**	**83**	**90**	
REPTILES / AMPHIBIANS							
Black Rat Snake	1	0	0	1	0	0	Rehab not oiled: 1
Box Turtle	2	0	0	2	0	0	Rehab not oiled: 1
Cooter Turtle	0	0	0	0	2	2	Dead w/ no visible oil: 1
Diamondback Terrapin	8	0	0	8	7	7	Death may not be oil related: 2. Rehab not oiled: 1. Dead w/ no visible oil: 3
Garter Snake	1	0	0	1	0	0	
Eastern Mud Turtle	20	1	1	18	0	1	Rehab not oiled: 2. Final disposition not identified: 1
Painted Turtle	3	0	0	3	1	1	Rehab not oiled: 1. Dead w/ no visible oil: 2
Rat Snake	3	0	0	3	0	0	Rehab not oiled: 3
Snapping Turtle	11	0	0	11	1	1	
Unidentified Snake	1	1	0	0	3	3	Dead w/ no visible oil: 1. Final disposition not identified: 1
Northern Water Snake	17	0	4	13	6	10	Rehab not oiled: 3. Rehab dead euthanized: 2. Death not oil related: 1
REPTILE / AMPHIBIAN TOTAL	**67**	**2**	**5**	**60**	**20**	**25**	
FISHES							
American Shad	0	0	0	0	1	1	
Bullhead	0	0	0	0	1	1	
Carp	1	0	1	0	5	6	Rehab death w/ not oiled: 1. Dead w/ no visible oil: 4
Catfish	1	0	1	0	32	33	Rehab death w/ not oiled: 1. Dead w/ no visible oil: 17
Eel	0	0	0	0	7	7	Dead w/ no visible oil: 6
Gizzard Shad	0	0	0	0	169	169	Dead w/ no visible oil: 98
Hog Choker	0	0	0	0	1	1	
Mummichog	0	0	0	0	99	99	100s Observed
Striped Bass	0	0	0	0	2	2	Dead w/ no visible oil: 1
Perch	0	0	0	0	8	8	Dead w/ no visible oil: 1
Unidentified Fish	0	0	0	0	212	212	Flat fish: 5. Dead w/ no visible oil: 189
FISH TOTALS	**2**	**0**	**2**	**0**	**537**	**539**	
INVERTEBRATE							
Blue Crab	10	0	1	9	49	50	Dead w/ no visible oil: 9
Horseshoe Crab	2	0	0	2	1	1	
Jellyfish	0	0	0	0	13	13	> 1000 Observed
Mussel	0	0	0	0	20	20	
INVERTEBRATE TOTALS	**12**	**0**	**1**	**11**	**83**	**84**	
TOTALS	**204**	**2**	**27**	**175**	**804**	**831**	

	Birds	Mammals	Reptiles	Fish	Invertebrates
8	318				
	48.74213836				
9	7	8	0	0	0
	14	100	0	0	0
10	109			2	112
	9.174311927	0	0	100	100
11	281	1		5	201
	58.71886121	100	0	100	100
12	172	7	11	101	
	41.86046512	71.42857	45.45455	0.990099	0
13	172	3	2	2	1
	34.88372093	0	0	50	100
14	92	12		301	
	4.347826087	100	0	0	0
15	75	1	1		12
	26.66666667	0	0	0	100
16	66				
	33.33333333	0	0	0	0

		Birds	Mammals	Reptiles	Fish	Invertebrates
8	1	48.7				
9	2	14.3	100	0	0	0
10	3	9.2	0	0	100	100
11	4	58.7	100	0	100	100
12	5	41.9	71.4	45.5	0.99	0
13	6	34.9	0	0	50	100
14	7	4.3	100	0	0	0
15	8	26.7	0	0	0	100
16	9	33.3	0	0	0	0

survey		Birds	Mammals	Reptiles	Fish	Invertebrates
8	1	318	155	0	0	0
9	2	7	8	0	0	0
10	3	109	0	0	2	112
11	4	281	1	0	5	201
12	5	172	7	11	101	0
13	6	172	3	2	2	1
14	7	92	12	0	301	0
15	8	75	1	1	0	12
16	9	66	22	0	0	0

		No. Incoming Calls
11	4	12
12	5	16
13	6	5
14	7	9
15	8	11
16	9	9
17	10	9
18	11	4
19	12	5
20	13	2
21	14	1
26	18	1

		Birds	Mammals	Reptiles	Fish	Invertebrates
11	4	12	0	0	0	0
12	5	15	0	0	1	0
13	6	5	0	0	0	0
14	7	6	1	1	1	0
15	8	11	0	0	0	0
16	9	1	1	4	2	1
17	10	4	0	5	0	0
18	11	3	1	4	0	0
19	12	1	2	0	0	0
20	13	1	1	1	0	0
21	14	1	0	0	0	0
26	18	0	0	1	1	0

% taxa calls		Birds	Mammals	Reptiles	Fish	Invertebrates	
11	4	100.00	0.00	0.00	0.00	0.00	100.00
12	5	93.75	0.00	0.00	6.25	0.00	100.00
13	6	100.00	0.00	0.00	0.00	0.00	100.00
14	7	66.67	11.11	11.11	11.11	0.00	100.00
15	8	100.00	0.00	0.00	0.00	0.00	100.00
16	9	11.11	11.11	44.44	22.22	11.11	100.00
17	10	44.44	0.00	55.56	0.00	0.00	100.00
18	11	50.00	0.00	50.00	0.00	0.00	100.00
19	12	25.00	75.00	0.00	0.00	0.00	100.00
20	13	50.00	50.00	50.00	0.00	0.00	150.00
21	14	100.00	0.00	0.00	0.00	0.00	100.00
26	18	0.00	0.00	100.00	100.00	0.00	200.00

survey total	Birds	Mammals	Reptiles	Fish	Invertebrates
12	172	7	11	101	0
13	172	3	2	2	1
14	92	12	0	301	0
15	75	1	1		12
16	66	22	0	0	0

total obser.	Birds	Mammals	Reptiles	Fish	Invertebrates
12	246	7	11	401	0
13	178	3	2	2	1
14	101	13	1	302	0
15	92	1	1	0	12
16	67	22	3	4	7

survey oiled					
12	72	5	5	1	0
13	60	0	0	1	1
14	4	12	0	0	0
15	20	0	0	0	12
16	22	0	0	0	0

call oiled

	Birds	Mammals	Reptiles	Fish	Invertebrates
11	150	0	0	0	0
12	74	0	0	300	0
13	6	0	0	0	0
14	9	1	1	1	0
15	17	0	0	0	0
16	1	0	3	4	7
17	8	0	5	0	0
18	3	0	9	0	0
19	1	3	1	0	0
20	1	1	1	0	0
21	1	0	0	0	0
26	1	1	1	0	0

%call and surv.

		Birds	Mammals	Reptiles	Fish	Invertebrates
8	1	48.7	0	0	0	0
9	2	14.3	100	0	0	0
10	3	9.2	0	0	100	100
11	4	73.0	100	0	100	100
12	5	59.35	71.43	45.45	75.06	0.00
13	6	37.08	0.00	0.00	50.00	100.00
14	7	12.87	100.00	100.00	0.33	0.00
15	8	40.22	0.00	0.00	0.00	100.00
16	9	34.33	0.00	100.00	100.00	100.00
17	10	100.00	100.00	100.00	100.00	100.00
18	11	100.00	100.00	100.00	100.00	100.00

19	12	100.00	100.00	100.00	100.00	100.00
20	13	100.00	100.00	100.00	0.00	0.00
21	14	100.00	100.00	100.00	100.00	100.00
26	19	100.00	100.00	100.00	100.00	100.00

		No. Incoming Calls
11	4	12
12	5	16
13	6	5
14	7	9
15	8	11
16	9	9
17	10	9
18	11	6
19	12	4
20	13	2
21	14	1
26	18	1